# BATTERY RATING CALCULATION

The formula employed rating calculation is as stipulated below :-

**FORMULA EMPLOYED:**

\[
\text{Capacity of Battery ( AH )} = \frac{\text{DC Current} \times \text{Duration in Hrs}}{\% \text{age capacity utilization}}
\]

\[
= \frac{\text{UPS(KVA) x 1000 x Load Power Factor (=1)}}{\text{Inverter efficiency} \times \text{End Voltage}}
\]

Hence, \( \text{VAH} \) = \( \text{AH} \times \text{Nominal Voltage} \)

**For e.g. : for 3 KVA UPS, 1 hour Backup :**

\[
\text{DC Current} = \frac{3 \times 1000 \times 1}{0.93 \times 10.5 \times 18} = 17.0 \text{ A}
\]

\[
\text{Battery } "\text{AH}" = \frac{17.0 \times 1.0}{0.62} = 27.4 \text{ AH}
\]

Hence, 18 nos of 12V/28AH batteries will suffice.

**TOTAL VAH = 18 x 12 x 28 = 6048 VAH**

The following assumptions have been made in the above calculations :-

1. DC Voltage – 216 for 3 KVA
2. End cell voltage / battery of 10.5 V
3. Load Power Factor = 1.0
4. Inverter efficiency = 93%

**% Capacity utilization is :**

<table>
<thead>
<tr>
<th>Duration</th>
<th>% Capacity utilization</th>
</tr>
</thead>
<tbody>
<tr>
<td>½ hr (30 mins)</td>
<td>52%</td>
</tr>
<tr>
<td>1hrs</td>
<td>62%</td>
</tr>
<tr>
<td>2hrs</td>
<td>74%</td>
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<tr>
<td>3hrs</td>
<td>83%</td>
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<tr>
<td>4hr</td>
<td>85%</td>
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